
Annual Research Review: Development of the cerebral cortex: implications for neurodevelopmental disorders.

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Authors: John L R Rubenstein

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Public Summary:

This is a general review article describing basic mechanisms that control development of the cerebral cortex.

Scientific Abstract:

The cerebral cortex has a central role in cognitive and emotional processing. As such, understanding the mechanisms that govern its development and function will be central to understanding the bases of severe neuropsychiatric disorders, particularly those that first appear in childhood. In this review, I highlight recent progress in elucidating genetic, molecular and cellular mechanisms that control cortical development. I discuss basic aspects of cortical developmental anatomy, and mechanisms that regulate cortical size and area formation, with an emphasis on the roles of fibroblast growth factor (Fgf) signaling and specific transcription factors. I then examine how specific types of cortical excitatory projection neurons are generated, and how their axons grow along stereotyped pathways to their targets. Next, I address how cortical inhibitory (GABAergic) neurons are generated, and point out the role of these cells in controlling cortical plasticity and critical periods. The paper concludes with an examination of four possible developmental mechanisms that could contribute to some forms of neurodevelopmental disorders, such as autism.

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